Lest we forget: Piper Alpha

Around 10pm on the night of 6 July 1988, George Carson noticed something strange from the Silver Pit. 120 miles off the coast of Aberdeen. Pouring himself a cup of tea in the ship’s galley, something flew past the window that was not bird-shaped, yet was big enough momentarily to block out the 11-inch porthole.

Also having a brew was Captain Morton on the bridge of the Maersk Cutter: his ship shook and he wondered if it had struck something in the sea. About 10 seconds later, he saw a light-grey cloud – “like cement dust” – coming from Occidental’s Piper Alpha platform, about a mile away.

On a third vessel nearby – the Tharos – a diving-unit pilot decided to take some photographs of Piper Alpha for his child’s school project. Standing with his camera raised, Tony Miller heard a thump, lowered his camera and after a second or two noticed grey smoke on Piper. Within a few seconds, large flames and thick black smoke began pouring from the platform.

What all three men had witnessed were the first signs of a series of explosions that would rapidly turn the largest and oldest platform in the North Sea into the worst offshore oil disaster the world has ever seen.

FATAL MISTAKES

In the days leading up to the disaster, Piper Alpha was an unusually busy place. As well as normal production, the platform’s 226 workers were involved in major construction work and additional maintenance. During the day on 6 July 1988, the pressure safety valve on one of the platform’s two large compressors was removed for an overhaul. At 6pm, with the work incomplete, the tube was temporarily sealed with a plate and the engineer filled out a form stating that compressor A was unready and should not be switched on. At 9.45pm, Piper’s second compressor stopped and could not be restarted. After failing to find the paperwork on compressor A’s safety valve because it was filed in a separate folder, personnel restarted compressor A. The gas now leaking from the system found an ignition source and, at around 10pm, exploded.

The force of the blast devastated the control room, buckled bulkheads, blew doors from their hinges and men from their bunks, and started a large fire in the oil-separation module fed by Tartan and Claymore, the other two platforms to which Piper was connected. Within minutes, the control room was abandoned, emergency systems failed, and at 10.08pm Wick radio picked up the last of three maydays from Piper Alpha: “We can’t talk any more – we’re on fire.”

Many of the men gathered in the accommodation area, but smoke and flames outside made it impossible for them to reach the lifeboats (none of which was launched). According to one survivor, Ed Punchard: “Men were now lying on the floor of the galley or in the stairwells, keeping low to reach some air. They were dipping towels in the fish tanks and wrapping them around their faces to help them breath.”

Like the other 60 men who survived Piper, Punchard made for the sea, where he was picked up by the Silver Pit. Looking back at the platform from the ship, he remembers: “We were only about a hundred yards away, we could clearly see men everywhere – still climbing down the ladder on the north-east corner and

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**BOX 1: THE PIPER ALPHA DISASTER**

- The Piper Alpha disaster in July 1988 killed 167 men – 165 workers on the platform and two crew of a rescue boat. It was the largest industrial disaster “in” the UK since the Gresford Colliery disaster of 1934.
- Only 137 bodies were recovered – the last almost a year after the disaster. Postmortems found that most victims had died of smoke and gas inhalation.
- A wreck buoy now marks the site of the former platform, 120m south-east of its replacement, Piper Bravo, and a memorial to those who died was erected in Aberdeen’s Hazlehead Park (see p.10).
- Built in 1976 as an oil platform, Piper Alpha was later converted to gas production and by 1988 was producing 10% of the North Sea’s oil and gas. Together with the Tartan and Claymore platforms, Piper Alpha was connected by a 128-mile pipeline to the Flotta oil terminal in the Orkneys.
- Ronnie McDonald, a safety training consultant in the offshore sector who was instrumental in the foundation of the Oil Industry Liaison Committee, told HSB that, at the time of the disaster, the throughput of oil and condensate was three times greater than it had originally been designed for. Worse still, a major gas compression and export facility had been “bolted on” in the late 1970s that had never been envisaged at the design stage. “The platform’s systems were, by some expert accounts, overworked and under the water line,” McDonald said, “and had become so structurally unstable that a seemingly never-ending dive programme was under way to strengthen the underwater structural members, many of which had become cracked. That is a matter of public record. It is also worth pointing out that such was the scope of the maintenance work under way that day – of which the removal of the safety valve was part – that the production should have been shut down.”
- Occidental – the platform’s owner – was never prosecuted (see box 2). McDonald says that shutting down the platform for Occidental was “not an option”: the company had $8 billion debts and the Piper/Claymore/Flota system was the “cash cow that serviced that debt”. Occidental and its co-venturer, Texaco, subsequently profited “handsomely” from the disaster, argues McDonald. Texaco “had the foresight to acquire ‘loss of business’ insurance, so did not lose a dime for the whole time the field was out of commission, and subsequently got the benefit of the hydrocarbon production that had been deferred by the disaster. Occidental built a new platform largely paid for by the taxpayer because capital costs of all development work can be offset against petroleum royalty and corporation tax liabilities. Again, this is a matter of public record.”

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Ronnie McDonald, a founder of the Oil Industry Liaison Committee, told HSB that while “we can only surmise what the ‘public interest’ might have been, it seems plausible that the evidence indicated that the state was at least as culpable as Occidental, so a criminal trial would best be avoided”. He also pointed out that the lord advocate was at the time a political appointment made by the secretary of state for Scotland (today, the appointment is a matter for the Scottish Executive under instruction from the first minister of Scotland).

McDonald emphasises that it would be a “mistake” to link the decision not to prosecute with allegations of culpability made against two dead process operators. The decision was made five years before a civil court judgment on the possible causal contribution of the two men (the allegation had been made by counsel for the contractors as part of a civil action concerning indemnities and underwriting obligations). The two dead men were not represented; the allegations went largely uncontested; and the civil judgment was made on a “balance of probabilities” test, which is lower than the criminal “beyond reasonable doubt”. Further, McDonald told HSB: “Insofar as it was necessary to identify the two men at all it was done only for the purpose of assigning liability for share among the respective dutyholders in the mutual indemnity club for the personal, contractual and loss of business compensation that was due. So far as cause and culpability are concerned, the two men and their families were victims, twice over.”

**BOX 2: FAILURE TO PROSECUTE**

The decision not to mount any prosecutions connected with the Piper Alpha disaster was taken by Scotland’s lord advocate, who advised in late 1989 that prosecution would not be “in the public interest”. The reasons as to why this would be the case were never revealed.

By the time his report was published in 1990, heard evidence from more than 150 witnesses. Cullen’s inquiry would signal a sea change in safety offshore.

Cullen found such serious failings in so many areas on Piper Alpha and in the wider UK offshore industry that the explosions had clearly been a disaster waiting to happen. On Piper itself, he highlighted failings in the permit-to-work (PTW) system, emergency training, communication, and in the platform’s firewalls and the equipment designed to deluge fires. More widely, he criticised Occidental management, the then Department of Energy’s (DEn’s) safety inspections and the industry’s rescue craft.

According to Frank Doran MP, many of whose Aberdeen Central constituents had been directly affected by the disaster: “What Lord Cullen said about the inspections on Piper Alpha could have been said about any number of offshore platforms. There was no effective control of safety standards offshore. I firmly believe that if the accident had not happened on Piper Alpha, it would have happened elsewhere in the North Sea.”

The most immediate cause of the disaster, the Cullen inquiry found, was the gas leak brought about by switching on the compressor from which the safety valve had been removed. An event of this type would not have happened if the PTW system had worked, but Cullen found failings in both the system itself and the way it was managed on the platform. The PTW system, he said, was based on “informal and unsafe practice” and was “knowingly and flagrantly disregarded”.

Once fire broke out on the platform, failings in procedures and equipment meant the men’s chances of surviving were already compromised. In a practice peculiar to Piper Alpha, the water-deluge system’s pumps were switched to manual when divers were working...
anywhere around the platform, meaning they would not start automatically in the event of fire. This, however, was the least of the problems in Piper Alpha’s water-deluge system, which was so clogged with scale that it probably would not have worked anyway. “A substantial number of the deluge heads in C module,” Cullen found, “would have been blocked with scale. This was a problem of long standing but by the time of the disaster the necessary replacement of the distribution pipework had not been carried out.”

Cullen was particularly scathing of what he described as “whatever traces there may have been of the coming into operation of any system for coping with a major emergency on the evening of 6 July”. Emergency drills had clearly never taken into account a scenario on the scale of the events that night, but, on top of this, emergency training was “ cursory “, “not consistently given” and not performed on the platform as often as Occidental required. According to Cullen: “The lack of a determined commitment to emergency training on the platform meant that the platform personnel were not as prepared for the disaster as they should have been.”

Crippled from the start

Singling out Piper Alpha’s offshore installation manager (OIM), who died on the night of the explosions, Cullen said: “He must have known that virtually every emergency system on the installation had been rendered ineffective and that Occidental’s system for response to emergencies on board was crippled from the start … It is unfortunately clear that the OIM took no initiative in an attempt to save life … There was only one way in which those who were in the accommodation could escape certain death there and that was to get down to the sea level by whatever means were available … In my view, the death toll of those who died in the accommodation was substantially greater than it would have been if such an initiative had been taken.”

Once the men were in the sea, the fact that most were rescued was more by luck than design. The Silver Pit, which rescued more than half of Piper Alpha’s survivors, was a converted trawler – like almost 90% of standby ships in the North Sea oil industry at the time – with a broken searchlight. Cullen said that despite the “outstanding courage” of rescue-craft crew who came to Piper’s aid that night, the standby vessels had numerous shortcomings. “The Silver Pit,” said Cullen, “was essentially unsuitable for the purpose of effecting the rescue of survivors … [and] this led in a number of instances to distress and delay in the process of recovering survivors.”

All these failings, Cullen decided, should have been obvious to the company’s managers. “Occidental management should have been more aware of the need for a high standard of incident prevention and firefighting. They were too easily satisfied that the PTW system was being operated correctly, relying on the absence of any feedback of problems as indicating that all was well. They failed to provide the training required to ensure that an effective PTW system was operated in practice. In the face of a known problem with the water-deluge system, they did not become personally involved in probing the extent of the problem and what should be done to resolve it as soon as possible. They adopted a superficial attitude to the assessment of risk of major hazard. They failed to ensure that emergency training was being provided as they intended. The platform personnel and management were not prepared for a major emergency as they should have been. The safety policies and procedures were in place: the practice was deficient.”

Inspections were “superficial”

Cullen laid the remaining blame for the disaster fairly and squarely on the DEn, the government department responsible in 1998 for both production and safety offshore. Despite the DEn’s Piper Alpha inspections in both June 1987 and June 1988 – the latter to ensure that the PTW system on the platform had been improved after it had led to the death of a rigger in September 1987 – he found the DEn inspectors to be “inadequately trained, guided and led, [and] persistent undermanning has affected not only the frequency but also the depth of their inspections”.

According to Cullen: “The inspections … were superficial to the point of being of little use as a

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Among the raft of post-Piper legislation were the Offshore Installations (Safety Representatives and Safety Committees) Regulations 1989. Enacted before Cullen reported, the Regulations were controversial and remain so within the trade union movement, for whom they represent unfinished business.

While Cullen was convinced that the offshore industry needed a system of safety reps and safety committees, his report concluded it would be inappropriate to replace the 1989 Regulations with the Safety Representatives and Safety Committees Regulations 1977 (SRSC). Unlike the 1977 Regulations, the 1989 Regulations were not built around a system of trade union reps and, as a result, offshore reps enjoy fewer powers than their onshore counterparts. It was a political arena into which Cullen seemed not to want to be drawn: his remit did not extend to industrial relations, he said, although he gave some support to the 1989 Regulations by observing that trade union membership offshore was “relatively limited”.

In 2005, Amicus (now Unite) called for complete revision of the offshore representatives regime. “The current health and safety legislation for offshore workers is out of date in an era that encourages greater participation in health and safety issues and management, and better workplace involvement and consultation … The second-class legislation that currently exists is fundamentally failing workers in the offshore industry, which should be in a position of excellence,” the union’s offshore officer, Rab Wilson, told HSB.

Jake Molloy, general secretary of the Oil Industry Liaison Committee, told HSB that the failure to extend the SRSC Regulations offshore was the “single biggest disappointment” after Cullen: “The [1989] Regulations are little more than a statutory requirement. They are tolerated and no more. Little more than lip service is paid to them in some places [so] the opportunity to influence safety day-to-day hasn’t happened,” said Molloy.

Ian Whewell, head of the HSE’s offshore division believes the 1989 Regulations are “not working badly but could work better”. “Workforce involvement can always be better, but the answer isn’t always trade union reps,” he told HSB. Because the Regulations rely too much on the culture of the platform and the company, there are good, positive examples of active safety committees but also others where safety reps are just tolerated, he went on. “That’s a lost opportunity … For safety reps and safety committees to thrive and deliver they need to operate in an environment that encourages them – and that depends on the company,” Whewell said.

In February 2008, the HSE’s industry advisory committee published revised guidance on worker involvement in offshore safety (HSB 367 p.6)1. The guidance sets out four principles of control, competence, cooperation and communication, and highlights the importance of participation of all employees in managing major hazard risks. Case studies illustrate the benefits of positive and negative approaches to worker involvement. The guidance was first published in 1996. Ian Whewell, who chairs the liaison committee, said: “The effective involvement of the workforce is essential if the UK offshore industry is to deliver the improvements in performance necessary for it to meet its target to be the safest in the world by 2010”. Jake Molloy called the publication “a timely reminder to everyone in the industry that offshore workers have a right to be involved and are indeed obliged to get involved in day-to-day matters affecting their health and safety”. The Offshore Contractors Association’s chief executive, Bill Murray, said the document “identifies the important role that the workforce, in particular, plays in keeping our people and places of work safe. There are multiple means of becoming involved, but the most important message is that no one should feel constrained in any way from reporting unsafe acts and conditions.”


**BOX 4: UNFINISHED BUSINESS?**

**Cullen’s 106 recommendations**

After Cullen reported in 1990, industry and the government adopted all 106 of his recommendations (see box 3 on p.7), leading to radical reform of the offshore regulatory regime. Legislation on representation offshore had already been implemented by the time Cullen recommended it in 1990 (see box 4), but, following Cullen, responsibility for regulating the safety of the industry was transferred to the HSE and three sets of Regulations were introduced, including the Offshore Installations (Safety Case) Regulations 1992 (revised in 2005). These Regulations implemented Cullen’s key recommendation that offshore dutyholders should systematically identify major hazards, assess the risks and set out the necessary controls in a safety case submitted to the HSE – meaning that no installation could operate in UK waters without the HSE’s formal acceptance of its safety case.

Speaking in a debate to mark the 15th anniversary of the disaster, former health and safety minister Des Browne told the Commons on 9 July 2003: “It is not just a matter of legislation; the industry’s whole approach to health and safety was galvanised by the Piper Alpha disaster and the subsequent report. The offshore industry spent more than £2 billion on health and safety improvements between 1988 and 1998. There is no doubt that the offshore industry is now safer than it was 15 … or even 10 years ago.”
WHERE ARE WE NOW?
The latest offshore industry health and safety statistics4, published earlier this year, show that in 2006/07 the major injury rate – 138.4 per 100,000 workers – was at its lowest level for a decade (the rate had peaked at 321.7 in 1997/98). But although over-three-day injuries were 55% lower than in 1995/96, they had increased by 7.4% between 2005/06 and 2006/07, and workers continue to die. During 2006/07, there were two fatalities offshore and since 1995/96 there have been only two reporting years when workers have not been killed.

Commenting on the statistics, Geoffrey Podger, the HSE’s chief executive, described the over-three-day injury rate as “disappointing” and added: “The number of major and significant hydrocarbon releases – one key indicator as to how major hazard risks are being managed – went up, and that is of particular concern.”

Late last year, the HSE published the results of a three-year offshore inspection programme of safety-critical elements that ran between 2004 and 2007 (HSE 365 p.7)4. Based on inspections of almost 100 offshore installations – nearly 40% of the total – and known as KP3, the report made uncomfortable reading for the industry, which was told that 50% of plant was in poor condition, half of the deluge systems gave cause for concern, and one platform had a backlog of 15,000 hours of safety-critical work (see box 5). The HSC chair, Judith Hackitt, said the report showed there was “still much more to do, and those in a position of leadership must ensure that systems, procedures and best practice are adopted”.

Commenting on the KP3 report, Ian Whewell, head of the HSE’s offshore division, warned: “To prevent major accidents, it is vital that companies have effective process-safety systems to ensure plant and equipment are properly maintained and working as intended. Our advice to the industry is clear: when looking at, and testing, systems and procedures on installations, companies must take a holistic approach and ensure that all those parts that need to work together to prevent a major incident do precisely that.”

“State of disrepair”
To Jake Molloy, general secretary of the offshore union the Oil Industry Liaison Committee, KP3 came as no surprise. “Modern platforms are in a state of disrepair ... From 1999 to 2003, the workforce and trade unions complained several times of poor maintenance, cuts in manning, competence, management systems and PTW – everything that existed in the run-up to Piper,” he told HSB.

He also called on the HSE to disclose more information about the operators whose performance had been found wanting during the KP3 inspections (the report does not “name names”, although the operators on whom the HSE served 18 enforcement notices as a result of the inspections are listed on the HSE’s enforcement database). “It is an industry still veiled in secrecy,” said Molloy. “There are no league tables. I’m not looking to name and shame, but for more transparency, honesty and trust ... We have league tables for schools and hospitals – why not for offshore operators?”

According to the industry, much of what the HSE found is a legacy of the major changes that occurred in the North Sea during the 1990s, when a slump in oil prices and a belief among some companies that they should quit the North Sea in favour of larger, more easily recoverable reserves elsewhere meant many operators made increasingly short-term decisions on asset integrity. Chris Allen, head of health and safety at the industry body Oil and Gas UK, told HSB: “It happened because of the cost pressures the industry was facing and [safety] improvement not being given the attention it should have been. That has now been reversed.”

Built to last?
But the fact that oil prices have now topped $100 a barrel – giving the North Sea a new lease of life – does not solve all the issues KP3 raised. Infrastructure and investment remain an important concern. New entrants, in the shape of medium-sized North American operators, may be willing to replace the older, more established firms that once dominated the North Sea, but the installations they are taking over

BOX 5: KP3 KEY FINDINGS
The HSE’s Key Programme 3 (KP3) inspections of nearly 100 offshore installation found:
- wide variations in performance of management systems and in the condition of hardware integrity across the industry;
- ineffective sharing of good and best practice across the industry;
- many senior managers not making adequate use of integrity management data and not prioritising maintenance;
- poor understanding of the role of asset integrity and the concept of barriers in major hazard risk control;
- most senior managers in need of better key performance indicators to inform their decision making and to focus resources; and
- evidence of a declining integrity performance, which could hamper future field development and long-term sustainability.
are reaching the end of the 20–25 years they were built to last. “They now have a future – because of improvements in drilling and seismic technology – of perhaps another 25–30 years. It is a challenge to keep platforms and pipelines safe,” Allen told HSB.

As well as asset integrity and maintenance, KP3 was critical of leadership and the extent to which some offshore operators shared best practice. This too, Allen challenges, pointing to the Step Change initiative\(^5\). Now semi-permanent, Step Change was set up in 1997 to halve accidents within three years. “We didn’t quite get there … [but] it’s characteristic of this industry – it’s a ‘can-do’ industry and we’ve always set ourselves stretching targets,” he says. As part of Step Change, senior managers meet every six weeks and, says Allen: “This industry has more leadership involvement in safety than any other I’ve come across.”

Overall, Allen believes the industry is managing safety risks well, but acknowledges that the hazards remain. “The hazards will always be there – we are working with hydrocarbons under pressure, in remote locations in a very testing environment, but the industry manages that risk well … We face some challenges, [but] I think that understanding in the industry of the risks and management with safety cases means that a Piper Alpha shouldn’t happen again.”

Asked how much the industry has changed since the Piper Alpha disaster, Whewell told HSB: “All the work we’ve done in risk profiles shows that the overall risks associated with hazards are significantly reduced.” According to Whewell, many things have contributed to this: “No single factor is responsible. It’s the fact that there are now a series of effective barriers in place that prevent leaks and their progression to a disaster.”

But there is no room for complacency. “We are continuing to find matters that cause us concern offshore, and a significant number of hydrocarbon releases. The increase last year in significant hydrocarbon releases is also a cause for concern,” he told HSB. Whewell also believes that the industry’s Step Change initiative should concern itself more with continuous improvement: “It’s not just about meeting numbers but looking at the whole suite of controls of major accident risks.”

The HSE also faces challenges: some stem from the need to work with the smaller firms now coming into the North Sea; others from having to compete with rising salaries in the industry. The HSE’s offshore division, according to Whewell, is “well resourced compared with other parts of the HSE, but we have considerable challenges with recruiting and retaining staff”.

A generation on
Twenty years on, with the first generation of workers to be born after the disaster beginning careers offshore, Piper Alpha continues to frame debate about safety in the industry. When the industry commemorates the 20th anniversary of Piper Alpha in a service of remembrance at the Oil Chapel in Aberdeen on Sunday 6 July this year, a few may also remember what Frank Dobson MP told the Commons in 1990 when the Cullen report was published: “Condolences and tributes are not enough. The 30,000 people who daily earn their living on North Sea installations work and live in a profoundly hostile environment. They deal with raw energy in concentrations the magnitude and danger of which it is hard to comprehend … We owe them more than tributes and condolences. We owe them the safest working conditions that can be obtained.”

\(^5\) “Step change in safety”, www.stepchangeinsafety.net.

Becky Allen is a freelance journalist and regular HSB contributor.